



FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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"THE DIRECTOR'S DIGEST"

D. M. Doty
Technical Director

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Since the animal protein materials produced by the rendering industry are used almost exclusively as ingredients in livestock feeds, any improvement in the proteins would almost certainly be reflected in a greater demand for the material with a consequent increase in value. Because of this fact a sizeable part of the FPRF research program is devoted to projects relating to improving the quality of our proteins and developing new uses for any protein materials of limited feeding value. Current findings on three projects relating to this subject are therefore of interest.

SELECTION OF ENZYMES FOR ENZYMATIC RENDERING

You will recall that the results of feeding trials with the product produced in the enzymatic rendering pilot plant studies were somewhat disappointing. This was probably due to the fact that all of the collagen protein was solubilized and therefore included in the dry soluble meal produced. Consequently we initiated further studies at Battelle Memorial Institute to study a large number of proteolytic enzymes and conditions of hydrolysis and select one or more enzymes that would not solubilize the collagen protein present. The results from this five month study show that it is possible to use enzymes and conditions of hydrolysis that solubilize only small amounts of collagen but do solubilize 75-80% of the high quality globular proteins. Furthermore, the data indicate that these more selective enzymes can be used at much lower concentrations than was possible with the enzyme used in the original studies. This will make the process considerably more attractive from an economic standpoint. The soluble, high-protein, low-ash meal obtained from some of the laboratory runs exhibited a very good amino acid profile which suggests that the product should be of very high nutritive quality.

MICROBIAL MODIFICATION OF COLLAGEN

Even though the collagen protein might be separated from the high quality globular protein by enzymatic rendering, the process would not be feasible unless some outlet can be found for the collagen.

Theoretically it should be possible to up-grade the nutritive quality of collagen by using it as a substrate for microbial conversion to higher quality protein. This is being investigated by Jules D. Porsche and Associates under a contract with FPRF. Preliminary results from this research show that a few strains of yeast will grow quite rapidly and luxuriantly in a medium containing collagen as the major source of energy and nitrogen. The inclusion of some additional materials at low concentrations in the culture medium greatly enhanced the rate of growth. Additional research is underway to determine whether or not the conversion of collagen to yeast protein is feasible from a nitrogen balance standpoint and to evaluate the nutritive quality of the converted protein by appropriate amino acid determinations.

NEW CHEMICAL DERIVATIVES OF COLLAGEN

Another outlet for collagen that might be separated by the enzymatic rendering process or by other methods would be new useful chemical derivatives of collagen for industrial use. FPRF is supporting research at The Gelatine and Glue Research Association in England to prepare and evaluate new chemical derivatives of collagen(or gelatin). As previously reported("The Director's Digest", December 17, 1965, No. 18), the chemical and physical properties of several new chemical derivatives of gelatin did not suggest that these components would show outstanding performance for micro-encapsulation or related uses. A more recent report from The Gelatine and Glue Research Association describes research relating to improved methods for preparing gelatin suitable for micro-encapsulation without the need for gum arabic. Also, research is underway to determine the feasibility of using eucollagen for the preparation of a whole new family of animal protein materials characterized by very high viscosities with complete absence of gelling properties. Furthermore, eucollagen is much more stable than gelatin to chemical breakdown at room temperature which then makes it possible to investigate reactions with reagents that would degrade gelatin thus leading to the preparation of substituted collagen compounds that cannot be prepared from gelatin.

FPRF RESEARCH COMMITTEE AND BOARD OF DIRECTORS MEETINGS

The FPRF Research Committee will meet July 6 at The Water Tower Inn, Chicago, beginning at 9:30 A.M. The Board of Directors will meet the following day, July 7, at the same place. If you have any suggestions relating to the research program of FPRF or any other matters that should be discussed at these meetings please notify the FPRF office or Mr. R. J. Fleming, Chairman of the Board of Directors.